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International Oil Supplies: Availability of Capacity and Oil Stocks To Offset a Disruption

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An Intelligence Assessment

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This paper was prepared by
Office of Global Issues. It was
coordinated with the Directorate of Operations.

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Comments and queries are welcome and may be directed to the Chief, Strategic Resources Division, OGI,

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Key Judgments

Information available as of 10 July 1984 was used in this report.

Attacks on oil tankers and threats of reprisals against export facilities in the Persian Gulf have raised concern about the spare oil productive capacity that would be available to offset a supply disruption. We estimate that surplus oil productive capacity worldwide is about 8 million b/d. Only about 3 million b/d is outside the Persian Gulf, and its use would depend on the willingness of governments to respond to needs for increased supply and any physical difficulties encountered in trying to raise production. Countries outside the Gulf having the most surplus capacity—Libya, Nigeria, and Venezuela—have not maintained output near estimated capacity levels for several years. Some producers would raise output only after prices start rising, and Libya, with one-fourth of the surplus outside the Gulf, might withhold its spare capacity for political reasons.

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In our view, a disruption in the Gulf that cannot be covered by a combination of increased production and reductions in stocks is unlikely. A significant loss of exports from Iran, Iraq, and Kuwait—a scenario with moderate probability—could be easily offset by other Gulf and non-Gulf producers. If Saudi shipments through the Gulf are also interrupted—a low probability in our view—capacity elsewhere could not offset the loss. In such a case, the availability of stocks could be critical, especially the 550 million barrels of government oil stocks in the United States, West Germany, and Japan and approximately 60 million barrels of Saudi floating stocks.

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In any disruption, uncertainty about the availability of excess capacity and stocks could still make the adjustment difficult. The market would not only need timely supply responses from producers and stockpiles, but also a general perception that such supplies are available. Even if additional supplies could cover the shortfall, the erosion of the cushion of surplus supply could still pressure prices upward.

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International Oil Supplies: Availability of Capacity and Stocks To Offset a Disruption

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Introduction

If Persian Gulf oil supplies are disrupted by further escalation of the Iran-Iraq war, the availability of surplus oil productive capacity and oil stocks will be critical in minimizing the impact. Many questions have arisen, however, about the willingness and ability of countries to use surplus capacity. Among the key uncertainties are the physical difficulties encountered if higher demands are suddenly placed on production systems that for years have operated well below rated capacities. Producing-country policies on using excess capacity also are unclear, in part because the circumstances of the disruption could heavily influence government decisions. Similarly, the willingness of many stockholders to part with inventories is doubtful and likely to hinge largely on inconstant market perceptions.

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Potential Disruptions

About 7-8 million b/d of oil is exported from Persian Gulf ports and another 1-2 million b/d is shipped through Iraq's and Saudi Arabia's export pipelines to facilities outside the Gulf. Although the escalation of the Iran-Iraq war raises the probability of an oil disruption, chances are slim that all Gulf supplies would be affected because of the limited capabilities of the combatants, the reliance of both countries on Gulf shipping, and the likelihood of Western intervention if a major blockage is attempted. A cutoff of all exports from Iran, Iraq, and Kuwait has a moderate probability, but would affect less than 4 million b/d, and could be readily offset by increased production of other Gulf and non-Gulf producers. A much more serious disruption, one with a low probability of occurrence in our view, is a cutoff of Gulf exports from Iran, Kuwait, and Saudi Arabia, which would remove at least 5 million b/d of oil supplies and also eliminate Saudi Arabia's ability to help compensate for the loss. Such a disruption would cause the market major difficulty since the lost supplies would exceed remaining excess productive capacity.

Defining Capacity

In assessing the ability of the international oil system to withstand a Persian Gulf oil shock, it is critical to know the levels of both excess production capacity and oil stocks. The key measurement for capacity is supply that can be brought on stream within 30 to 90 days—an amount we define as available capacity. For most non-Communist oil-producing countries, significant output increases are not likely before 30 days because of the need to step up maintenance and because of the time required for testing, rescheduling of production and export operations, and mobilization of the work force. After 90 days, in essence, much of the price damage would have been done largely because market perceptions regarding the scale of the disruption would probably already have been hardened. This was the case during the disruptions of the 1970s. We estimate that available capacity worldwide now exceeds current oil production by about 8 million b/d, an amount we refer to as surplus or excess capacity.

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The Surplus in the Persian Gulf

The bulk of worldwide surplus capacity is in the Persian Gulf. The surplus in the Gulf is about 5 million b/d, of which 3 million b/d is in Saudi Arabia and another 1 million b/d is in other nonbelligerent states. These countries consider stable oil prices to be in their own best interests and, in our view, all are likely to respond immediately to any disruption in which they are not involved by raising output. Besides the Saudis' 3 million b/d, the excess capacity in the Gulf is distributed as follows:

- Kuwait's surplus capacity is only about 300,000 b/d, as prolonged market weakness has prompted Kuwait to slash the capacity of online facilities to a level close to the government's self-imposed production ceiling of 1.25 million b/d.
- The UAE has imposed ceilings on individual fields that limit its surplus capacity to about 400,000 b/d.
- We believe Iran could still raise output to 3.2 million b/d without extensive outside help—about 900,000 b/d above recent production levels.

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Capacity Trends and the Market Backdrop

The dramatic drop in oil consumption in recent years has led to substantial erosion in oil productive capacity, particularly among OPEC producers. Lower oil revenues have caused cutbacks in investment both to save money and to avoid development of capacity to produce oil that would be difficult to sell. Despite producing more than 31 million b/d of crude oil and natural gas liquids in 1979, total productive capacity in OPEC that could be available within 90 days of a decision to raise output has fallen to less than 27 million b/d. Non-OPEC producers have another 25 million b/d in available capacity—including about 700,000 b/d in refinery processing gains.

Under current market conditions, non-Communist available supply of 53 million b/d—including 52 million b/d of productive capacity and refining gains and over 1 million b/d of net imports from Communist countries—can easily accommodate consumption needs, projected at about 45 million b/d in 1984 by most industry forecasters. Although current surplus capacity of 8 million b/d has fallen from a recent peak of about 10 million b/d in early 1982, it is well above the estimated 2 million b/d existing at the outbreak of the Iranian revolution in late 1978. In the absence of a major disruption, the current available capacity can easily meet anticipated increases in consumption in the next few years.

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Seasonal variations in consumption and stock changes can cause production and surplus capacity to vary considerably during the year. Although we expect excess capacity to remain at about 8 million b/d in third quarter 1984, a rise in output sparked by a seasonal rise in demand could reduce surplus capacity to about 7 million b/d in the fourth quarter. The distribution of excess capacity also could change substantially because of recent increases in the cost of obtaining Persian Gulf oil as a result of higher shipping charges. Higher production outside the Gulf would reduce the excess capacity available to respond to a Gulf disruption. So far, however, we have not observed any major changes in the pattern of excess capacity since the start of the escalation of tanker attacks in early May, primarily because Iran has been willing to discount its prices to offset the higher shipping charges.

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- Iraq has virtually no spare available capacity; production is effectively limited by the capacity of Iraq's export pipeline through Turkey.

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- Qatar and the Neutral Zone have a combined surplus capacity of about 400,000 b/d.

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Saudi Arabia's excess capacity of about 3 million b/d, although still the largest anywhere, has dropped dramatically in the past two years. Implementing a strategy we have monitored closely, the Saudis have reduced their crude oil productive capacity by about 2 million b/d to a level of about 8.5 million b/d—including 500,000 b/d of natural gas liquids—as a result of large-scale cutbacks and mothballing of Saudi production equipment to cut costs.

however, problems in maintaining mothballed equipment put into question Saudi ability to return to high-capacity levels.

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Riyadh has been highly secretive about its capacity reduction. the Saudis believe that its ability to control prices depends as much on perceived as actual Saudi surplus capacity. At least when Riyadh initiated the cutbacks, the Saudis also believed that planned capacity levels could deal with nearly all emergencies. Riyadh remains interested in helping to insulate Saudi and Western economies from a disruption, having invested in a 1.85-million-b/d pipeline to the Red Sea in 1981 and placed about 60 million barrels of crude in storage near major consuming centers over the past year.

Elsewhere in the Gulf, *Kuwait* has implemented cutbacks in capacity for the same reasons as the Saudis.

Although the capacity of *Iran*'s export facilities have not been significantly affected by the war, postrevolutionary policies deemphasizing oil production and Western participation have led to a sharp reduction in productive capacity. the main constraint on capacity is the condition of surface facilities. These have been poorly maintained and in many cases have been cannibalized or shut down for long periods.

Surplus Capacity Outside the Persian Gulf

Only about 3 million b/d excess capacity is outside the volatile Persian Gulf area. About 2 million b/d of this is concentrated in Libya, Nigeria, and Venezuela. All are members of OPEC and have reduced output in recent years to conform with OPEC-assigned quotas. None has produced near estimated available capacity for several years except for surges—none recent—by Venezuela. OPEC countries outside the Persian Gulf have surplus available capacity as follows:

- We believe that Nigeria has about 800,000 b/d of surplus capacity based on detailed assessments of Nigeria's oil production capabilities from a number of companies operating there. Nigeria probably could quickly raise output to 2.2 million b/d from recent levels averaging about 1.4 million b/d.

Non-Communist Oil Supplies [a] [b] *Million barrels per day*

	Available Capacity	First Half 1984 Production	Surplus Capacity
OPEC Persian Gulf	**17.1**	**11.8**	**5.3**
Saudi Arabia	8.5	5.2	3.3
Iran	3.2	2.3	0.9
Iraq	1.2	1.2	0
Kuwait	1.3	1.0	0.3
UAE	1.7	1.3	0.4
Qatar	0.6	0.4	0.2
Neutral Zone	0.6	0.4	0.2
Non-Persian Gulf	**34.8**	**32.1**	**2.7**
OPEC non–Persian Gulf	9.5	7.2	2.3
Indonesia	1.6	1.5	0.1
Libya	1.8	1.1	0.7
Nigeria	2.2	1.4	0.8
Venezuela	2.3	1.8	0.5
Algeria	1.2	1.0	0.2
Ecuador	0.2	0.2	0
Gabon	0.2	0.2	0
Non-OPEC	25.3	24.9	0.4
Mexico	3.2	2.9	0.3
North Sea	3.5	3.5	0
Canada	1.8	1.7	0.1
United States [c]	10.9	10.9	0
Other [c]	5.9	5.9	0
Total	**51.9**	**43.9**	**8.0**

[a] Estimated.
[b] Includes natural gas liquids.
[c] Includes refinery processing gains.

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- Libya controls about 700,000 b/d of surplus capacity—or about one-fourth of the surplus outside the Persian Gulf. Tripoli has enforced a self-imposed production ceiling of 1.75 million b/d in recent years, and industry reports indicate that available capacity has deteriorated to close to this level since the state oil company took over much of production responsibilities from US companies. Production has averaged less than 1.2 million b/d since 1980, which, with the loss of considerable expertise, probably would require at least 60 days of heightened effort before Libya could approach available capacity.

- US Embassy sources in Venezuela's state oil company indicate that Caracas could raise production of crude oil and gas liquids by about 500,000 b/d over recent output levels—to a level of 2.3 million b/d. A Venezuelan official told the US Embassy in Caracas that output could be increased immediately by about 100,000 b/d from light and medium crude fields, but that it would take up to six weeks to reopen wells in heavy crude fields to provide another 400,000 b/d. We believe that the additional 400,000 b/d probably would take longer because of the expense and technical effort involved.

- Algeria's crude oil capacity has been in decline in recent years because of the maturity of its fields. Crude production has fluctuated widely, dropping from 800,000 b/d in third quarter 1983 to about 650,000 b/d recently. Algeria also can produce about 400,000 b/d of natural gas liquids. At recent output levels, we estimate that Algeria has about 150,000 b/d of additional capacity.

- Companies operating in Indonesia indicate that Jakarta has only about 100,000 b/d of spare productive capacity. Extensive foreign participation in Indonesia's oil production and development probably would enable Jakarta to raise output to 1.6 million b/d in less than 90 days.

We estimate surplus available capacity in non-OPEC producers outside the Gulf at about 400,000 b/d. Since non-OPEC producers have more flexibility to adjust prices to maximize sales, most are already producing at or near capacity. Mexico is the only non-OPEC producer that we expect to maintain a sizable amount of spare capacity through 1984:

- Mexico has about 300,000 b/d of excess capacity, mainly in wells that have been shut-in or choked back in the huge offshore Cantarell heavy crude complex. Most of this capacity probably could be brought on stream within 30 days. 25X1 25X1

- We believe Canada has roughly 100,000 b/d.

- North Sea producers have virtually none.

- Although the Department of Energy estimates US surplus capacity will be about 200,000 b/d in the third quarter, this will largely dissipate by the fourth quarter.

Likely Production Responses to a Gulf Disruption 25X1

The prospects that excess capacity outside the Persian Gulf would be made available during a Gulf disruption vary widely. In general, we believe that most producers—including Nigeria, Venezuela, Algeria, Indonesia, and Mexico—would be strongly motivated to raise output for financial reasons. Experience suggests that these countries will also charge what the market will bear. Libya would be the main problem. We believe the response of Libya, an ally of Iran, probably would be political as much as economic:

- Nigeria would quickly respond to an opportunity to raise output. Revenue needs already have led Lagos to lobby for a higher production quota and to produce as much as 400,000 b/d above its 1.3-million-b/d quota for several months in the past year. Nigeria recently called for an extraordinary OPEC meeting to discuss measures to prevent non-OPEC producers from taking advantage of the Gulf situation.

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The Controversy Over Capacity

Varying concepts and estimates have given rise to a wide range of figures representing surplus productive capacity. Estimates circulating in the US Government are as high as 12 million b/d. Although this amount of additional production might ultimately be available after an extensive and prolonged buildup, we believe that substantial price increases would be well under way before such supply increases would be available.

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- Libya's response to a disruption is uncertain. Although Tripoli would benefit considerably from a surge in oil revenues, its financial position is strong enough to withhold additional output for political reasons. Libya may not be willing to help offset a supply shortfall that is instigated by Tehran.

- Although Venezuela has announced that it would not raise output in response to a disruption, we agree with the US Embassy's assessment that Caracas's position is flexible. Venezuela's public statements probably are intended to help avoid a breakdown in OPEC discipline. The Venezuelans are studying their capability to boost production quickly and could use an infusion of revenues. Raising output substantially would require considerable expense, however, which Caracas would be reluctant to undertake without prospects of a prolonged period of higher prices.

- Algeria and Indonesia are both eager to raise production for financial reasons.

- Mexico's public statements on increasing output have been ambiguous. On one hand, the director of Pemex has said that Mexico would act responsibly and that producers outside the Gulf should cooperate to prevent destabilization of oil prices. On the other hand, Pemex sources have been quoted as saying that Mexico would maintain its 1.5-million-b/d export ceiling while shifting exports away from US customers toward countries more affected by a Gulf disruption. We believe Mexico may be reluctant to raise output even temporarily because of the uncertain effects on future production in offshore fields. Current restraints on well flows were imposed to avoid reducing ultimate recovery by overproduction.

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Inventories: An Addition to Surplus Capacity

Inventories—particularly government stocks—can also play an important role in minimizing the shock of a supply shortfall. At present, we estimate that non-Communist oil stocks on land are about 4 billion barrels, but most of these are working stocks or compulsory inventories mandated by government or IEA emergency reserve obligations. [redacted] the only stocks that might be immediately available to offset a disruption are about 100-150 million barrels of commercial stocks currently surplus to minimum operating and compulsory inventory needs, about 60 million barrels of Saudi floating stocks, and part of the 550 million barrels held in consuming-government stockpiles. At maximum drawdown rates, these stocks could provide as much as 4 million b/d in the first 90 days of a supply cutoff. This would require a reduction of about 2 million b/d in commercial stocks, an average 1-million-b/d drawdown of the US strategic reserve, and the sale of all of the Saudis' and some other government stocks. Cautious policies almost certainly would prevent such a rapid release, however, especially in view of Japan's and West Germany's reluctance to use their reserves except as a last resort, and also the tendency of stockholders to hold or even add to inventories until the end of a disruption is in sight. [redacted]

Uncertainties about the availability of stocks will play a large role in determining their effectiveness. Only the Saudi and US reserves are considered by companies to be readily available. The US strategic reserve could begin to reach the market in 30 days and, after 45 to 60 days, be drawn down for five months at a peak rate of 1.7 million b/d or three months at 2.1 million b/d, according to the Department of Energy. The 60-million-barrel stockpile maintained by the Saudis outside the Gulf is perceived as oil that could be available even sooner if needed only to dampen budding price pressures stemming from a disruption. [redacted] even with stock drawdowns, at least temporary price runups could occur if the drawdown fails to compensate quickly for perceived shortages in markets most affected by a supply cutoff. [redacted]

Importance of Market Perceptions

Market reaction to the escalating attacks on Persian Gulf shipping in recent months has been relatively calm, primarily because of widespread perceptions that a significant, sustained disruption is unlikely. [redacted] the combatants cannot maintain a shutoff of oil flows, and, should supplies be threatened, Western intervention would prevent a prolonged disruption. Moreover, [redacted] in the unlikely event of a major disruption, surplus capacity in nonaffected countries and most government-owned stocks—especially US- and Saudi-held reserves—would be readily available. These perceptions could change if the conflict escalates rapidly, supplies are curtailed, and both Western intervention and the supply response are not quick to materialize. Price pressures could arise even in the absence of real shortages because of uncertainties regarding the length and size of the disruption. Many owners of commercial stocks would hoard inventories either for speculation or as a contingency for perceived shortages. In such a case, the supply response to a disruption could fail to ease price pressures even if it adequately compensates for supply losses. [redacted]

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Implications for Offsetting a Gulf Disruption

The present surplus capacity cushion could not eliminate potential price increases posed by a disruption of Persian Gulf oil supplies. The key consideration is the availability of oil from Saudi Arabia, with 8.5 million b/d of available capacity. A Persian Gulf disruption that excludes the Saudis could be offset by Riyadh's own excess capacity and the surplus outside the Gulf. For example, a disruption involving Iran, Iraq, and Kuwait would affect less than 4 million b/d of exports—an amount that could be covered fairly easily from the nearly 7 million b/d of excess capacity in unaffected countries. As long as Saudi oil is generally available, the market's ability to adjust to a disruption without major price increases remains substantial. [redacted]

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A disruption involving the Saudis could not be readily offset. Even with maximum use of its 1.85-million-b/d Red Sea pipeline, the loss of Persian Gulf exports from Saudi Arabia—which could occur if export and other oil facilities were extensively damaged—would eliminate more than 2 million b/d of exports compared with recent levels. More importantly, Saudi spare capacity of 3 million b/d would also be unavail able, and, if other Gulf countries are involved—as is likely—the market will suffer a net shortfall. For example, if Gulf exports from Iran, Kuwait, and Saudi Arabia are lost, at least 5 million b/d of exports would be affected, even assuming that Saudi Arabia's pipeline exports continue. Unaffected countries would have at most 3.5 million b/d to offset the loss. As a result, stock drawdowns would be required to ease price pressures. [redacted] 25X1

In our view, any disruption in the Gulf probably would not exhaust the market's surplus capacity and oil stockpiles—unless it involves Saudi Arabia as well as producers in the northern Gulf and lasts several months. Uncertainty about the availability of excess capacity and stocks, however, could make the adjustment more difficult. In a major, prolonged disruption, the market would not only need a strong supply response from producers and stockpiles, but also a general perception that such supplies are available. Even if additional supplies could cover the shortfall, the erosion of the cushion of surplus supply could still pressure prices upward. [redacted] 25X1

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